

REMARKS

Claims 1 to 20 are currently pending. Claims 15 to 20 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1 to 6 and 15 to 17 have been rejected under 35 U.S.C. 102(e) as being anticipated by United States Patent No. 6,337,760 (Huibers et al). Claims 1 to 20 have been rejected under 35 U.S.C. 102(e) as being anticipated by United States Patent No. 6,687,428 (Huber et al).

Claim 15 has been amended to more clearly define the structural relationship between each input port(s), each output port, and the ATO element. Accordingly, reconsideration of the indefiniteness objection is hereby requested.

With reference to the first 102(e) rejection to claim 1, the Huibers et al reference fails to disclose several key features of the invention as defined in claim 1. In particular, the optical arrays of mirrors 104 and 106 are not “opposed”, as defined in claim 1, they are arranged in the “Z-shape” pattern, as in the disclosed prior art. Furthermore, the input and output ports 100 and 102 found in the Huibers et al device are not disposed within the optical array, rather they are in separate arrays adjacent to and to the rear of the optical arrays in the Z-shaped arrangement. Foremost, the Huibers et al reference does not disclose the use of one fixed mirror, which receives every incoming light beam, and another fixed mirror, which redirects every outgoing light beam, regardless of which output port the light beam is to be switched. In the device disclosed by Huibers et al, the first and last mirrors, which redirect the light beam, are tilting mirrors and totally dependent upon which input and output port the light beam passes. Moreover, claim 1 has been amended to clarify that the beam of light travels through the ATO element each time it passes between the arrays of tilting mirrors to further differentiate the present invention from the Huibers et al device. Huibers et al disclose the use of a single collimating lens, associated with each input port, which does not provide angle to offset functionality for directing the beam between the input and output ports via the tilting and fixed mirrors. The present invention as defined in claim 1 provides an extremely compact optical switch core without the drawbacks of the Z-shaped configuration.

With reference to the first 102(e) rejection to claims 15 to 17, the Huibers et al reference also fails to disclose key features of the present invention, as defined in claim 15. Foremost, the lens disclosed by Huibers et al is a simple collimating lens for collimating the incoming beam 110. The

Huibers et al lens does not provide any angle to offset transformation, nor does it redirect the beam of light five times as the light travels back and forth between the input ports, the first and second array of deflectors and the output ports. Furthermore, Huibers et al do not disclose the use of a fixed mirror for redirecting the output beam of light, regardless of which output port is being used.

With reference to the second 102(e) rejection to claims 1 to 6, the Huber et al reference fails to disclose several key features of the present invention as defined in claim 1. In particular, Huber et al do not disclose an optical array with a plurality of tiltable mirrors and a fixed mirror, rather Huber et al discloses an array of tiltable mirrors 38 and a separate array of fixed mirrors 48. As above, the input and output ports, in the device disclosed in Huber et al, are not disposed within one of the optical arrays, as defined in claim 1. Moreover, Huber et al fail to disclose an ATO element providing angle to offset functionality between the optical arrays for directing the light beam during each pass between arrays, rather the ATO element forms one of the SLM arrays, as suggested by the Examiner, or is placed remote from the arrays, as in lenses 14, 16 and 18, which only redirects the light beam once during output. Each input fiber 20, disclosed in the Huber et al reference, requires a different SLM, see col 3, lines 40 to 44, which greatly increases cost and manufacturing complexity. In contrast, the present invention includes a pair of opposed optical arrays, which provide switching functionality for all of the input and output ports in a compact structure.

Claim 7 of the application has been amended to overcome the objections of the Examiner and to better define the invention in light of the cited prior art. In particular, claim 7 now defines an optical switch including a plurality of input ports, a plurality of output ports, a first fixed mirror and a second fixed mirror. The first fixed mirror is positioned to receive each of the input beams for directing them at the first plurality of tiltable mirrors via the ATO element, while the second fixed mirror is positioned to receive the output beams for directing them at the second plurality of tiltable mirrors via the ATO element. The Huber et al reference does not disclose the use of first and second sets of independently tiltable mirrors, and in particular does not include a first fixed mirror that receives all of the input beams from the input ports and directs them to the first set of tiltable mirrors, and a second fixed mirror that receives all of the outgoing beams from the second set of tiltable mirrors for directing at the output ports.

Further inventive features are defined in claim 10, which specifies that each beam is redirected 5 times by the ATO element between the input and output ports. Claim 13 further defines

the first and second fixed mirrors as a single fixed mirror, as disclosed in Figure 7, whereby each beam of light is reflected by the single fixed mirror on the way into the switch and on the way out of the switch. This feature, which provides a simple and compact structure, is both novel and unobvious

Claims 9, 10, 11, 13 and 14 have been amended in accordance with amendments to claim 7.

Claim 15 of the application has been amended to overcome the objections of the Examiner and to better define the invention in light of the cited prior art. In particular, claim 15 now defines an optical switch including a plurality of input ports, a plurality of output ports, and a fixed mirror. The fixed mirror is positioned to receive each of the input beams for directing them at the first plurality of tiltable mirrors via the ATO element, and to receive the output beams for directing them at the second plurality of tiltable mirrors via the ATO element. The Huber et al reference does not disclose the use of first and second sets of independently tiltable mirrors, and in particular does not include a fixed mirror that receives all of the input beams from the input ports and directs them to the first set of tiltable mirrors, and that receives all of the outgoing beams from the second set of tiltable mirrors for directing at the output ports. The switch according to the present invention is both simple and compact requiring few parts.

Claims 16 and 17 have been cancelled, and claims 18 to 20 have been amended in accordance with the amendments to claim 15.

Due to the perceived vast differences between the cited prior art and the present invention, and the probability in encountering resistance in obtaining aid from the inventor(s), who now work for a competing company, Applicant has opted to provide arguments to traverse the objections under 35 U.S.C. 102(e); however, Applicant reserves the right to attempt to swear behind the references, if necessary, in the future.

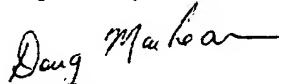
As such, it is respectfully submitted that all of the claims remaining in the application are in condition for allowance. Early and favorable consideration would be appreciated.

Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

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